

WHAT IS CLAIMED IS:

1. An image forming apparatus for digitally reproducing a color image using a screen set consisting of a halftone screen  
5 for each color, wherein  
a first-color halftone screen and a second-color halftone screen in said screen set satisfy a relationship that first vectors, each being either one of two screen vectors in a spatial frequency domain defined by basis vectors in two  
10 directions of a halftone dot pattern in the first-color or second-color halftone screen, are parallel to each other, and second vectors, each being the other one of the two screen vectors, are not parallel to each other.
- 15 2. An image forming apparatus according to claim 1, wherein said first-color halftone screen and said second-color halftone screen further satisfy a relationship that said first vectors are equal in magnitude.
- 20 3. An image forming apparatus according to claim 2, wherein at least one of said first-color and second-color halftone screens is a non-orthogonal screen.
4. An image forming apparatus according to claim 2, wherein a  
25 third-color halftone screen and a fourth-color halftone screen satisfy a relationship that second vectors, each being either one of two screen vectors in a spatial frequency domain defined by basis vectors in two directions of a halftone dot pattern in the third-color or fourth-color halftone screen, are parallel to

each other as well as equal in magnitude, and first vectors, each being the other one of the two screen vectors, are not parallel to each other.

5 5. An image forming apparatus according to claim 4, wherein said second vector of said first-color halftone screen matches either one of secondary spectra, each represented by the sum or the difference of two screen vectors of said fourth-color halftone screen, and

10 said first vector of said third-color halftone screen matches either one of secondary spectra, each represented by the sum or the difference of two screen vectors of said second-color halftone screen.

15 6. An image forming apparatus according to claim 5, wherein said first vector of said first-color halftone screen, said first vector of said third-color halftone screen, and said second vector of said second-color halftone screen form an closed triangle, and

20 said second vector of said first-color halftone screen, said first vector of said fourth-color halftone screen, and said second vector of said third-color halftone screen form an closed triangle.

25 7. An image forming apparatus according to claim 2, wherein said second vector of said first-color halftone screen matches either one of two screen vectors of a third-color halftone screen in said screen set.

8. An image forming apparatus according to claim 7, wherein a secondary spectrum represented by the sum or the difference of the two screen vectors of said first-color halftone screen matches either one of two screen vectors of a fourth-color  
5 halftone screen in said screen set.

9. An image forming apparatus according to claim 2, wherein said screen set comprises four color halftone screens, and the four color halftone screens have a relationship that  
10 two closed triangles can be formed using two screen vectors of each of the four color halftone screens, without a remainder.

10. An image forming apparatus according to claim 2, wherein in a case where directions of halftone dot arrangement match  
15 between said first-color and second-color halftone screens, halftone dot intervals in the matched direction of the first-color halftone screen differ from the halftone dot intervals in the matched direction of the second-color halftone screen.

20 11. An image forming apparatus according to claim 2, wherein said screen set comprises four color halftone screens, and among a total of 8 primary spatial frequency spectra each corresponding to one of the screen vectors for each color and a total of 8 secondary spatial frequency spectra each  
25 corresponding to the sum or the difference of the screen vectors for the same color, the number of different spatial frequency spectra contained in a band of from the minimum frequency to the maximum frequency of said 8 primary spatial frequency spectra is less than 8.

12. An image forming apparatus according to claim 11, wherein said screen set comprises four halftone screens, one for each color, and

5 among a total of 8 primary spatial frequency spectra, each corresponding to one of the screen vectors for each color and a total of 8 secondary spatial frequency spectra, each corresponding to the sum or the difference of the screen vectors for the same color, the number of different spatial frequency  
10 spectra contained in a band of from the minimum frequency to the maximum frequency of said 8 primary spatial frequency spectra is 6.

13. An image forming method for digitally reproducing a color  
15 image, comprising the steps of:

generating halftone images from input color images using a screen set consisting of multiple color halftone screens, wherein a first-color halftone screen and a second-color halftone screen in said screen set satisfy a relationship that  
20 first vectors, each being either one of two screen vectors in a spatial frequency domain defined by basis vectors in two directions of a halftone pattern of the first-color or second-color halftone screen, are parallel to each other, and second vectors, each being the other one of the two screen vectors, are  
25 not parallel to each other, and

reproducing said input color images by combining said halftone images.

14. An image forming method according to claim 13, wherein said

first-color halftone screen and said second-color halftone screen further satisfy a relationship that said first vectors are equal in magnitude.

- 5 15. An image forming method according to claim 14, wherein at least one of said first-color and second-color halftone screens is a non-orthogonal screen.